

# THE MINERAL INDUSTRY OF OTHER ISLANDS OF THE CARIBBEAN

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The Islands of the Caribbean produced modest amounts of minerals. In many cases, production is limited to industrial minerals for internal consumption. Several islands produce cement. The economies of other islands, however, rely heavily on exports of mineral commodities, and a few islands are among the top producers of one or two mineral commodities. Bauxite and alumina, cement, chromite, cobalt, crude petroleum, gold, iron and steel, natural gas, nickel, petroleum refinery products, phosphate rock, and salt are among the mineral commodities produced. The islands reviewed in this chapter are among the smallest producers of mineral commodities in the area.

## **Antigua and Barbuda**

The volcanic Islands of Antigua and Barbuda are east of Puerto Rico. Sand and gravel and crushed stone industries supported the local construction industry. On Antigua Island, limestone crops out along the northern and eastern coasts and was quarried for the construction industry. Barbuda produced a small amount of salt in 1996.

## **Aruba**

Aruba, of volcanic origin, is northwest of Venezuela. Aruba has few natural resources; thus, mining contributes little to the economy of the island. In 1996, Coastal Aruba Refining Co. N.V., a subsidiary of Coastal Corp. of Houston, Texas, produced asphalt, diesel fuel, feedstock for Coastal's other refineries, kerosene, and residual fuel oil at the Lago refinery. Petroleum and other mineral products were shipped from the ports of Oranjestad and Sint Nicolaas.

## **The Bahamas**

The Bahama Islands, on the northern edge of the Caribbean Basin, comprise 20 major islands and thousands of small islands. The islands' coralline limestone base rests on the volcanic foundation, but most of the exposed rock is oolitic limestone.

In 1996, mineral production on The Bahama Islands was limited to aragonite, cement, petroleum products, salt, sand and gravel, and stone. Aragonite sand was dredged off the Great Bahamas Bank, south of the Biminis. Limestone and sand were produced by Freeport Aggregate Ltd., in Freeport, for the

domestic construction industry. Marine salt was produced in evaporation pans on Great Inagua Island, the southernmost island in The Bahamas archipelago. The Bahamas imported all its oil for the domestic processing of petroleum products. The Bahamas' mineral exports included aragonite blocks, petroleum products, and salt. The United States was The Bahamas' most significant trading partner.

## **Barbados**

Barbados is a relatively small island of the Lesser Antilles about 160 kilometers east of St. Vincent. The mineral sector contribution to the economy was minor in 1996. The principal mineral commodities produced in Barbados were crude petroleum and natural gas. Industrial mineral production included cement, clays, limestone, and sand and gravel. The Arawak Cement Co., operated by Trinidad Cement Ltd., produced cement from imported clinker and was the sole producer of cement on the island, exporting to regional markets. The Barbados National Oil Co. Ltd. was the only operating crude oil company on the island. The company also produced natural gas and liquid petroleum gas. The Mobil Oil Barbados Ltd. petroleum refinery is on the southwestern coast.

## **Bermuda**

Bermuda is a small archipelago of 7 main islands and about 150 other islands and islets resting on volcanic foundations. The mineral industry was insignificant in 1996. All mineral commodity requirements were imported, except for some local stone production, primarily coralline limestone. Quarries are privately owned, with low employment requirements. Lacking rivers and streams, Bermuda collects its freshwater from rainwater and seawater desalination plants. Petroleum was imported. Mineral exports consist almost entirely of the reexport of fuel oil. The United States continued to be one of Bermuda's most important trading partners. Other significant partners included Canada, Italy, and the United Kingdom.

## **Dominica**

The volcanic Island of Dominica is 550 kilometers southeast of Puerto Rico, between Guadeloupe and Martinique Islands, in the Lesser Antilles. In 1996, Dominica produced clay, limestone, pumice, volcanic ash, sand and gravel, and volcanic ash primarily for the construction industry. It was the leading regional producer of freshwater, exporting it to the other

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Caribbean islands. The Government supported the use of geothermal energy and drilled a number of test wells. Dominica was dependent on imports for oil and raw and semimanufactured materials. The island exported small quantities of sand and gravel and crushed stone mostly to Guadeloupe and the Virgin Islands. In 1993, Dominica became a contracting party to the General Agreement on Tariffs and Trade.

### **Grenada**

The most southern of the Windward Island chain, or Lesser Antilles, Grenada consists of Grenada and several islands near the southern Grenadines, near the southern end of the Lesser Antilles off the northeast coast of Venezuela. There are no reported mineral industries in Grenada, although limestone and sand and gravel are produced for the local construction industry.

### **Guadeloupe and Martinique**

Guadeloupe and Martinique are Overseas Departments of France. Included are the islands of Basse-Terre, Grande-Terre, Iles des Saintes, La Desirade, Marie-Galante, St. Barthelemy, and the French side of Sint Maarten (Saint Martin). Guadeloupe and Martinique are 500 and 625 kilometers, respectively southeast of Puerto Rico and are near the northern end of the Lesser Antilles. The Basse-Terre portion of Guadeloupe is volcanic in origin, and the Grand-Terre area is a limestone formation. Martinique is a dormant volcano.

Industrial minerals, such as cement, clays, lime, pumice, salt, sand and gravel, and stone, were mineral commodities produced in Martinique in 1996. All mineral products, except for some cement and sand and gravel, were used domestically. Petroleum products were refined on Martinique from imported crude oil.

### **Haiti**

Haiti is part of the western area of the Island of Hispaniola, which it shares with the Dominican Republic. The gross domestic product increased by 2% compared with that of 1995 (Inter-American Development Bank, 1997). A new Government took office in early 1996.

The small mineral industry on Haiti was involved in the production of cement, the mining of clays and limestone for cement production, the quarrying of a small quantity of marble, the production of marine salt, and the dredging for sand and gravel and other minerals used in the construction industry. In northern Haiti, deposits of chromite, copper, gold, iron ore, lead, manganese, silver, sulfur, tin, and zinc are small and undeveloped. In 1996, refined petroleum products were all imported.

KWG Resources Inc., a Canadian company exploring in the Caribbean region, had interest in several properties in Haiti (KWG Resources Inc., 1996). The company had a 70% interest in the Douvray and the Blondin copper properties in northern Haiti. Douvray's estimated reserves total 193 million metric tons with 0.56% copper. Reserves at Blondin were calculated to be 52 million tons also with 0.56% copper. Overall gold

values were reported to be in the range of about 2 grams per ton, with Blondin's grades being substantially higher than those of Douvray. The remaining 30% interest in both properties was held by another Canadian company, St. Geneviève Resources.

KWG and St. Geneviève had similar interests in Faille B, 7 kilometers southeast of Blondin where estimated gold resources of 552,000 metric tons with 0.412 ounces per ton (12.8 grams per ton) were calculated for the deposit's upper 150 meters. KWG had interest in two other deposits, Grand Bois and Morne Bossa. The company entered into an agreement with La Société Minière Citadell S.A. in March 1995 (KWG Resources Inc., 1995). These deposits were examined during a mineral survey study conducted by the U.N. Development Program and Haiti's Bureau des Mines et de Ressources Énergétiques from 1973 through 1989. Grand Bois had reserves of 4.73 million tons grading 0.065 ounces per ton (2 grams per ton) of gold. Calculated reserves were 3.6 million tons with 0.08 ounces of gold, all of it in oxide ores. A feasibility study was being conducted in the property in 1996 (KWG Resources, 1996).

Mazarin Mining Corp. of Quebec obtained an option to buy three gold concessions in northern Haiti (Metals and Minerals Latin America, 1996). Mazarin planned to spend \$330,000 in 2 years exploring the 250-square-kilometer area, which includes old underground workings that have produced 1.5 million metric tons of ore having 2 grams of gold per ton and 2% copper.

### **Montserrat**

Montserrat, a volcanic island, is just south of Antigua and Barbuda in the Lesser Antilles. Small quantities of sand and gravel and other quarry products constituted its mineral industry. The island's mineral requirements were imported through the Port of Plymouth. In 1995 and 1996, the Soufriere Hills volcano erupted causing significant damage to the island (Moore, 1997). As a result, the United Kingdom, of which Montserrat is a dependent territory, waived immigration requirements to allow Montserratians who have someone with whom to stay in the United Kingdom the opportunity to move to and work in that country.

### **Netherlands Antilles**

The two major islands of the Netherlands Antilles, Bonaire and Curaçao, are northwest of the coastline of Venezuela. The rest of the country, the Saba Islands, Sint Eustatius, and the Dutch side of Sint Maarten, are east of Puerto Rico, 800 kilometers to the north. All the islands are of volcanic origin. In 1996, mining and mineral production contributed little to the economy of the Netherlands Antilles, which did, however, produce limestone, phosphate rock, refined petroleum products, and solar salt in Curaçao. Salt was exported to other Caribbean islands, New Zealand, and the United States from the Port of Willemstad in Curaçao. Refined petroleum products also were exported to the Netherlands and other countries. Refinería Isla S.A. in Curaçao, a Petróleos de Venezuela S.A. (PDVSA) subsidiary, leased the 113-million-barrel-per-year oil refinery at Willemstad from the Government of the Netherlands Antilles.

PDVSA also recovered about 40,000 tons of sulfur at the refinery. The ocean terminal and facilities on Bonaire, owned by PDVSA, were used for storage and transshipment. Salt has been produced on Bonaire since the 16th century. AKZO Salt Antilles N.V. operated a 2,226-hectare, 360,000-metric-ton-per-year solar salt facility on the southern end of Bonaire.

A stone-crushing plant was operating on Saba Island. Aggregate was quarried on Sint Maarten by Bouwwbedrijf Bowne Winden N.V., a subsidiary of Devcon International Corp. of Deerfield Beach, Florida. Production was consumed primarily by the local construction industry. A petroleum transshipment terminal operated on Sint Eustatius.

### **Saint Kitts and Nevis**

Saint Kitts and Nevis are volcanic islands southeast of Puerto Rico. The Federation of Saint Kitts and Nevis consists of Saint Christopher and Nevis islands. Although the mineral industry of Saint Kitts and Nevis produced some construction materials and salt, mining contributed little to their economies, and most basic mineral requirements were imported in 1996. Beach sand mining was proscribed under the 1987 National Conservation and Environmental Protection Act.

### **Saint Lucia**

The volcanic island of Saint Lucia is 150 kilometers north of Grenada in the Lesser Antilles. Gravel and sand pits and pumice quarries supplied the island's construction sector, which is tied to hotel expansion. Hess Oil St. Lucia Ltd. maintained a petroleum storage and transshipment terminal near Castries, the island's capital. Geothermal energy studies were conducted at the boiling volcanic sulfur springs near Soufriere on the southwestern coast. In 1993, Saint Lucia became a contracting party to the General Agreement on Tariffs and Trade.

### **Saint Vincent and the Grenadines**

The small volcanic islands of Saint Vincent and the Grenadines are between the islands of Saint Lucia to the north and Grenada to the south. A small industrial mineral production supplied sand and gravel and road material needed by the construction industry. Small quantities of salt were privately produced.

### **References Cited**

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### **Major Sources of Information**

#### **Antigua**

Ministry of Economic Development and Energy  
Queen Elizabeth Highway  
Saint John's, Antigua

#### **Aruba**

Central Voor de Statistiek  
Windstraat 21  
Oranjestad, Aruba

#### **The Bahamas**

Ministry of Agriculture, Trade and Industry  
Nassau, The Bahamas

#### **Barbados**

Ministry of Trade, Industry, and Commerce  
Bridgetown, Barbados, West Indies

#### **Grenada**

Ministry of Communications  
Saint George's, Grenada

#### **Guadeloupe and Martinique**

Bureau de Recherches Geologiques et Minière  
Abymes, Guadeloupe, French West Indies  
Bureau de Recherches Geologiques et Minière  
Fort-de-France, Martinique, French West Indies  
Service des Mines et de L'Industries  
Pointe-à-Pitre, Guadeloupe, French West Indies  
Service des Mines et de L'Industries  
Fort-de-France, Martinique, French West Indies

#### **Haiti**

Bureau des Mines et de Resources Energetiques  
Port-au-Prince, Haiti

#### **Saint Lucia**

Ministry of Trade, Industry, and Agriculture  
Castries, Saint Lucia

#### **Saint Vincent and the Grenadines**

Ministry of Trade, Industry, and Agriculture  
Kingstown, Saint Vincent

TABLE 1  
ARUBA, NETHERLANDS ANTILLES, AND SAINT KITTS AND NEVIS:  
PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996
Aruba: 2/					
Petroleum refinery products thousand 42-gallon barrels	35,569	45,199	50,670	52,070	62,436
Sulfur, byproduct of petroleum	9,340	34,300	34,000	31,700	48,787
Netherlands Antilles: 2/					
Petroleum refinery products thousand 42-gallon barrels	75,323	75,592	72,416	70,519 r/	70,104
Phosphate rock e/	-- r/	-- r/	-- r/	--	--
Salt	350,000 e/	300,000 e/	420,240	424,065	366,265
Sulfur, byproduct of petroleum	31,900	31,900	42,500	24,410	23,921
Saint Kitts and Nevis: e/					
Salt	5,000	5,000	5,000	-- r/ 3/	-- 3/
Sand and gravel	60,000	60,000	60,000	70,031 3/	50,389 3/
Stone, crushed	80,000	80,000	80,000	88,583 3/	106,902 3/

e/ Estimated. r/ Revised.

1/ Table includes data available through Feb. 18, 1998.

2/ In addition to commodities listed, crude construction materials (lime, sand, stone, etc.) may also be produced. But data on such production are not available, and information is inadequate to make reliable estimates of output levels.

3/ Reported figure.

TABLE 2  
THE BAHAMAS: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Thousand metric tons)

Commodity 2/	1992	1993	1994	1995	1996
Salt	809 3/	850	900	900	900
Stone, aragonite	871 3/	1,100	1,200	1,200	1,200

1/ Table includes data available through Feb. 18, 1998.

2/ In addition to commodities listed, crude construction materials (sand and gravel, etc.) may also be produced. But data on such production are not available, and information is inadequate to make reliable estimates of output levels.

3/ Reported figure.

TABLE 3  
BARBADOS: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

Commodity 2/	1992	1993	1994	1995	1996
Cement, hydraulic thousand metric tons	175	62 3/	78 3/	75 3/	107 3/
Gas, liquefied petroleum 42-gallon barrels	18,900 3/	18,000	20,000	20,000	20,000
Gas, natural:					
Gross million cubic meters	33	33	35	35	35
Marketed do.	15	15	15	15	15
Petroleum:					
Crude thousand 42-gallon barrels	479 3/	462 3/	474 3/	475 3/	380
Refinery products do.	2,120	2,200	2,250	2,250	2,250

1/ Table includes data available through Feb. 18, 1998.

2/ In addition to commodities listed, crude construction materials (clays, sand and gravel, stone, etc.) were also produced. But data on such production are not available, and information is inadequate to make reliable estimates of output levels.

3/ Reported figure.

TABLE 4  
GUADELOUPE AND MARTINIQUE: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Thousand metric tons unless otherwise specified)

Commodity 2/	1992	1993	1994	1995	1996
<b>Guadeloupe:</b>					
Abrasives, natural, pumice	220	210	210	210	210
Cement	235	230	230	230	230
<b>Martinique:</b>					
Cement, hydraulic	240	220	220	220	220
Lime	5,000	5,000	5,000	5,000	5,000
Petroleum refinery products	4,800	4,800	4,800	4,800	4,800
Pumice	140	130	130	130	130
Salt	200	200	200	200	200

1/ Table includes data available through Feb. 18, 1998.

2/ In addition to commodities listed, crude construction materials (sand and gravel, stone, etc.) may also be produced. But information is inadequate to make estimates of output levels.

TABLE 5  
HAITI: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1992	1993	1994	1995	1996
Cement, hydraulic	200,000	100,000	75,000	50,000	50,000
Clays, for cement	30,000	10,000	10,000	7,000	7,000
<b>Sand and gravel:</b>					
Gravel	3,000,000	1,000,000	750,000	750,000	750,000
Sand	2,000,000	500,000	250,000	250,000	250,000
<b>Stone:</b>					
Limestone, for cement	220,000	100,000	75,000	50,000	50,000
Marble	500	200	100	100	100

1/ Table includes data available through Feb. 18, 1998.

2/ In addition to commodities listed, asphalt, lime, and salt may also be produced, but data on such production are not available, and information is inadequate to make reliable estimates of output levels.